A.D. 1866, 10*th* *May*. N° 1338.

Gas Governors.

LETTERS PATENT to Orlando Brothers, of Blackburn, in the County of Lancaster, Gas Engineer, for the Invention of "IMPROVEMENTS IN GOVERNORS OR APPARATUS FOR REGULATING AND CONTROLLING THE PRESSURE AND FLOW OF ILLUMINATING GAS OR OTHER GASEOUS FLUIDS."

Sealed the 11th September 1866, and dated the 10th May 1866.

PROVISIONAL SPECIFICATION left by the said Orlando Brothers at the Office of the Commissioners of Patents, with his Petition, on the 10th May 1866.

I, ORLANDO BROTHERS, of Blackburn, in the County of Lancaster, Gas Engineer, do hereby declare the nature of my said Invention for "IMPROVEMENTS IN GOVERNORS OR APPARATUS FOR REGULATING AND CONTROLLING THE PRESSURE AND FLOW OF ILLUMINATING GAS OR OTHER GASEOUS FLUIDS," to be as follows:—

The class of governor to which this Invention relates, as heretofore constructed, consists of a tank or outer case of cylindrical form filled with water to a certain height, and open at the top. A "float" or gasholder is introduced into the said tank, gas being supplied by means of an inlet pipe

entering the said tank at the bottom, and continued to above the water line, discharging gas into the "float" or gasholder. The outlet pipe is in like manner introduced and continued to the interior of the float or gasholder above the water line. Attached to the last-mentioned pipe and to the top of the float or gasholder is a cone valve for the purpose of controlling the discharge of gas, as follows:—As the pressure of gas from the inlet pipe is increased the float or gasholder is raised, thus partially closing the orifice of the valve, and preventing the too rapid discharge or delivery of gas. As the pressure decreases the float or gasholder descends and raises the valve. It is found in practice that governors constructed as above described do not insure an equal pressure and flow of gas when such governors are stationed at varying altitudes, a considerable pressure having to be maintained during the day (or at some altitudes there would be no supply), which is objectionable, because of the loss by leakage.

In constructing governors or apparatus for regulating and controlling the pressure and flow of illuminating gas according to my Invention I form the float or gasholder with a "difference chamber," or chamber for the reception of atmospheric air, the supply and discharge of atmospheric air (as the float ascends or descends) being obtained by means of a pipe, the lower end of which is open to the atmosphere, the other end of the said pipe terminating in the difference chamber. To the inlet pipe of the governor is connected a second pipe, communicating with a "gas chamber" placed over or above the float or gasholder. The action of the valve and flow of gas is regulated with great nicety by the aid of the "difference chamber" and gas chamber, because the inlet pressure is caused (by the pressure in the gas chamber) to act on the top of the float or gasholder as well as underneath, thus causing an upward and downward pressure, and on account of a certain area of the underneath surface of the float or gasholder (namely, the area of the difference chamber,) being connected with the atmosphere by means of the pipe above mentioned, and therefore not under the action of the upward pressure or lifting power of the gas, the downward pressure acting upon a greater area will overcome the upward pressure, and depress the float or gasholder until the immersion to a certain depth causes an upward pressure equal to the downward pressure caused by the gas chamber opening the cone valve, and as this immersion will be greater or less as the inlet pressure increases or decreases, so will the valve be opened or closed and the outlet pressure or flow be increased or decreased. It will be perceived from the above that by raising the water line a greater inlet pressure will be required to open the valve, and a less pressure will be given on the outlet of the

governor. Thus by regulating the water line any pressure on the inlet can be reduced to the pressure required on the outlet, so that when the governor is fixed water will have to be run into it until the inlet pressure is reduced on the outlet to the pressure required at the daytime; the only attention afterwards required will be keeping the water line to its adjusted level, for when the pressure is increased at the works it will cause a greater pressure on the inlet of the governor, which by opening the valve, as already described, will cause a corresponding increase on the outlet, and as the pressure is reduced the float or gas holder will rise, thus reducing the pressure to the point at which it was adjusted.

This governor is chiefly intended to regulate the pressure of gas in districts where the difference of level between the outlet from the works and the place supplied with gas causes the pressure to be increased to an amount which is unnecessary and objectionable on account of leakage.

In constructing these governors the "air chambers," difference chamber, and cone will have a relative proportion one to another, according to the size of the inlet and outlet pipes.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Orlando Brothers in the Great Seal Patent Office on the 29th October 1866.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, ORLANDO BROTHERS, of Blackburn, in the County of Lancaster, Gas Engineer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Tenth day of May, in the year of our Lord One thousand eight hundred and sixty-six, in the twenty-ninth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Orlando Brothers, Her special licence that I, the said Orlando Brothers, my executors, administrators, and assigns, or such others as I, the said Orlando Brothers, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term herein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN GOVERNORS OR APPARATUS FOR REGULATING AND CONTROLLING THE PRESSURE AND FLOW OF ILLUMINATING GAS OR OTHER GASEOUS FLUIDS," upon the condition (amongst

others) that I, the said Orlando Brothers, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Orlando Brothers, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The class of governor to which this Invention relates, as heretofore constructed, consists of a tank or outer case of cylindrical form filled with water to a certain height and open at the top; a "float" or gasholder is introduced into the said tank, gas being supplied by means of an inlet pipe entering the said tank at the bottom and continued to above the water line, discharging gas into the float or gasholder; the outlet pipe is in like manner introduced and continued to the interior of the float or gasholder above the water line. Attached to the last-mentioned pipe and to the top of the float or gasholder is a cone valve for the purpose of controlling the discharge of gas, as follows:— As the pressure of gas from the inlet pipe is increased the float or gasholder is raised, thus partially closing the orifice of the valve and preventing the too rapid discharge or delivery of gas; as the pressure decreases the float or gasholder descends and raises the valve. It is found in practice that governors constructed as above described do not insure an equal pressure and flow of gas when such governors are stationed at varying altitudes, a considerable pressure having to be maintained during the day (or at some altitudes there would be no supply, which is objectionable because of the loss by leakage.

In constructing governors or apparatus for regulating and controlling the pressure and flow of illuminating gas according to my Invention I form the float or gasholder with a "difference chamber," or chamber for the reception of atmospheric air, the supply and discharge of atmospheric air (as the float ascends or descends) being obtained by means of a pipe, the lower end of which is open to the atmosphere, the other end of the said pipe terminating in the difference chamber. To the inlet pipe of the governor is connected a second pipe communicating with a "gas chamber" placed over or above the float or gasholder. The action of the valve and flow of gas is regulated with great nicety by the aid of the "difference chamber" and gas chamber, because the inlet pressure is caused (by the pressure in the gas chamber) to act on the top of the float or gasholder, as well as underneath, thus causing an

upward and downward pressure, and on account of a certain area of the underneath surface of the float or gasholder (namely, the area of the difference chamber) being connected with the atmosphere by means of the pipe above mentioned, and therefore not under the action of the upward pressure or lifting power of the gas, the downward pressure acting upon a greater area will overcome the upward pressure and depress the float or gasholder until the immersion to a certain depth causes an upward pressure equal to the downward pressure caused by the gas chamber opening the cone valve; and as this immersion will be greater or less as the inlet pressure increases or decreases, so will the valve be opened or closed, and the outlet pressure or flow be increased or decreased. It will be perceived from the above that by raising the water line a greater inlet pressure will be required to open the valve, and a less pressure will be given on the outlet of the governor. Thus by regulating the water line any pressure on the inlet can be reduced to the pressure required on the outlet; so that when the governor is fixed, water will have to be run into it until the inlet pressure is reduced on the outlet to the pressure required at the daytime; the only attention afterwards required will be keeping the water line to its adjusted level, for when the pressure is increased at the works it will cause a greater pressure on the inlet of the governor, which by opening the valve as already described will cause a corresponding increase on the outlet, and as the pressure is reduced the float or gasholder will rise, thus reducing the pressure to the point at which it was adjusted. This governor is chiefly intended to regulate the pressure of gas in districts where the difference of level between the outlet from the works and the place supplied with gas causes the pressure to be increased to an amount which is unnecessary and objectionable on account of leakage. In constructing these govenors the "air chamber," difference chamber, and cone will have a relative proportion one to another, according to the size of the inlet and outlet pipes.

Such being the nature and object of my said Invention, I will now proceed to describe more in detail the manner in which the same is to be or may be performed or carried into practical effect; and in order that the same may be distinctly understood I have hereunto annexed a Sheet of Drawings illustrative thereof, and have marked the same with letters of reference corresponding with those in the following explanation thereof, similar letters of reference being placed upon corresponding parts of the apparatus in the two views or Figures.

Fig. 1 is a cross vertical section of a governor constructed according to my Invention; Fig 2 is a sectional plan of the same. At *a*, *a*, is shewn a float

or gasholder having a difference chamber A, or chamber for the reception of atmospheric air, the supply and discharge of atmospheric air (as the float ascends or descends) being obtained by means of a pipe B, the lower end *b* of which is open to the atmosphere, the other end of the said pipe terminating in the difference chamber. At C, C, is shewn a gas chamber, which is supplied with gas by means of the pipe D, from the inlet D^1. The float or gasholder *a* is also supplied from the inlet pipe D^1 (course of entrance shewn by arrows). At E is shewn an air chamber or sealed compartment for imparting buoyancy. The action of the conical valve F, and flow of gas by way of the outlet pipe G, is regulated with great nicety by the aid and use of the difference chamber A, and gas chamber C, because the inlet pressure is caused (by the pressure in the gas chamber C) to act on the top of the float *a*, as well as underneath, or in the interior of the said float; thus causing a downward pressure from the gas chamber C, and an upward pressure or lifting power from the gas in float *a*; and on account of a certain area of the underneath surface of the float or gasholder, namely, the area of the difference chamber being connected with the atmosphere by means of the pipe B, and therefore not under the action of the upward pressure or lifting power of the gas, the downward pressure of the gas in the chamber C acting upon a greater area, will overcome the upward pressure and depress the float or gasholder *a* in the water contained in the governor, thus opening the cone valve F until the immersion to a certain depth of the air chamber E causes an upward pressure or buoyancy equal to the downward pressure the immersion will be greater or less as the inlet pressure increases or decreases; so will the cone valve F be opened or closed, and the outlet flow be increased or decreased. It will be seen from the above that on the water being raised a greater inlet pressure will be required to open the cone valve F, and a less pressure will be given on the outlet of the governor. Thus by regulating the water line any pressure on the inlet can be reduced to the pressure required on the outlet, so that when the governor is fixed and water run into it (through the pipe K), until the inlet pressure is reduced on the outlet to the pressure required in the daytime; the only attention afterwards required is to maintain the water line at its adjusted level, for when the pressure is increased (at the works) it will cause a greater pressure on the inlet of the governor, which by opening the valve as already described will cause a corresponding increase on the outlet, and as the pressure is reduced (at the works) the float *a* will be raised, and the orifice of the conical valve F partially closed, reducing the pressure to the point at which it was adjusted. At H, H, are shewn guide pulleys, which serve to keep the floating parts of

the apparatus in proper position. J is the outer casing of the apparatus; K is a pipe through which the apparatus is supplied with water.

Having thus fully described the nature and particulars of this my said Invention, together with the manner in which the same is to be or may be performed or carried into practical effect, I would remark in conclusion that I do not claim the float or gas chamber *a*, the conical valve arrangement of the inlet and outlet pipes, or the pipe through which the apparatus is supplied with water, nor the guide pullies or air chamber E, as such are old and well understood; but what I do claim as my Invention is,—

Firstly, the construction of governors or apparatus for regulating and controlling the pressure and flow of illuminating gas or other gaseous fluids with a gas chamber and the pipe communicating therewith), over or above the float as above described and illustrated in the accompanying Drawings.

Secondly, the use and employment of the difference chamber and pipe, connected therewith as above described and illustrated.

Lastly, I claim the general combination and arrangement of the apparatus as above described and shewn in the Drawings.

In witness whereof, I, the said Orlando Brothers, have hereunto set my hand and seal, this Sixteenth day of October, in the year of our Lord One thousand eight hundred and sixty-six.

ORLANDO BROTHERS. (L.S.)

Witness,
WALTER BRIERLY,
Patent Agent,
Halifax & Blackburn.

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1866.

A.D. 1866, May 10, N°1338,
BROTHERS' Specification.

(1 SHEET

FIG. 1.

Section.

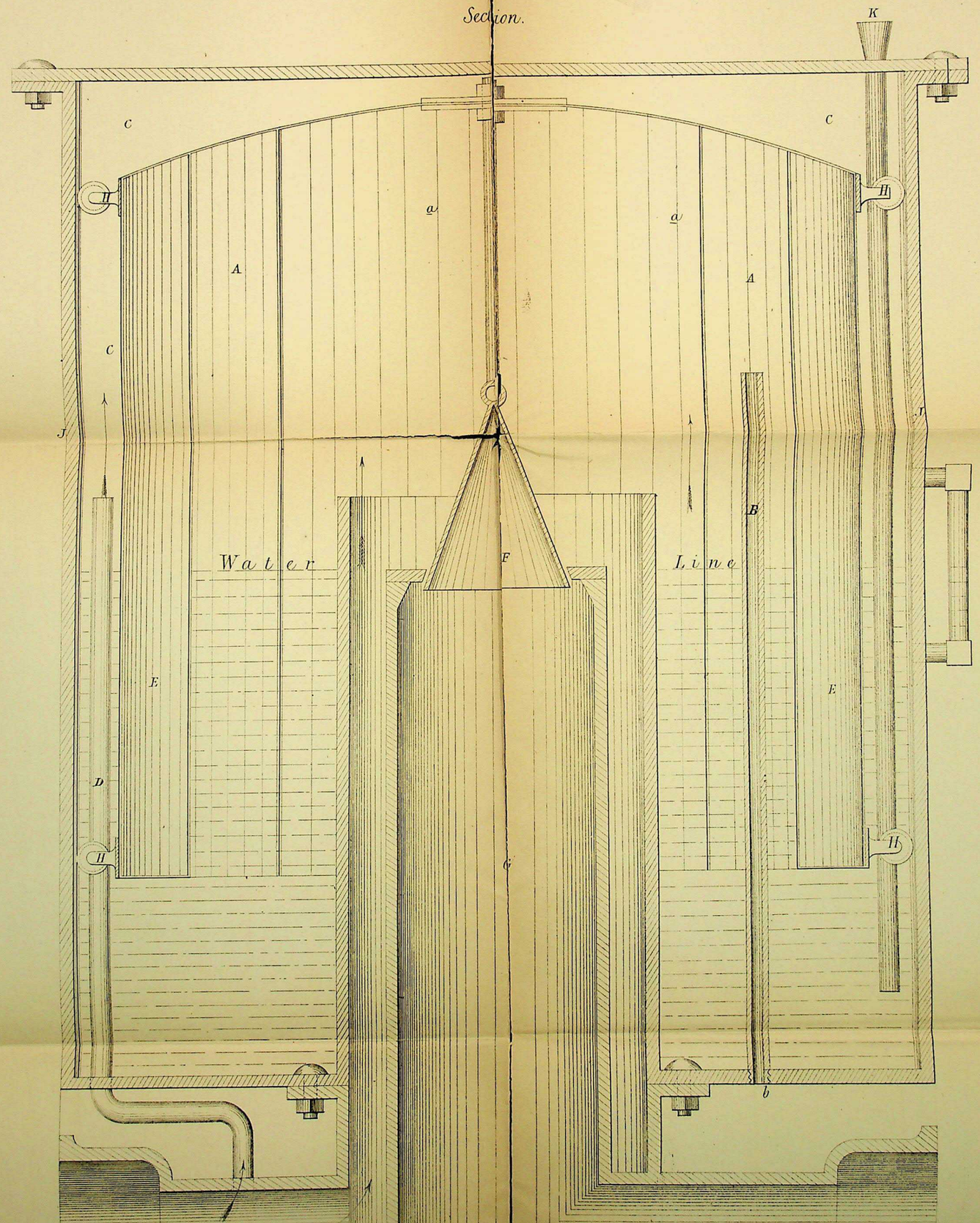


FIG. 1.

Section.

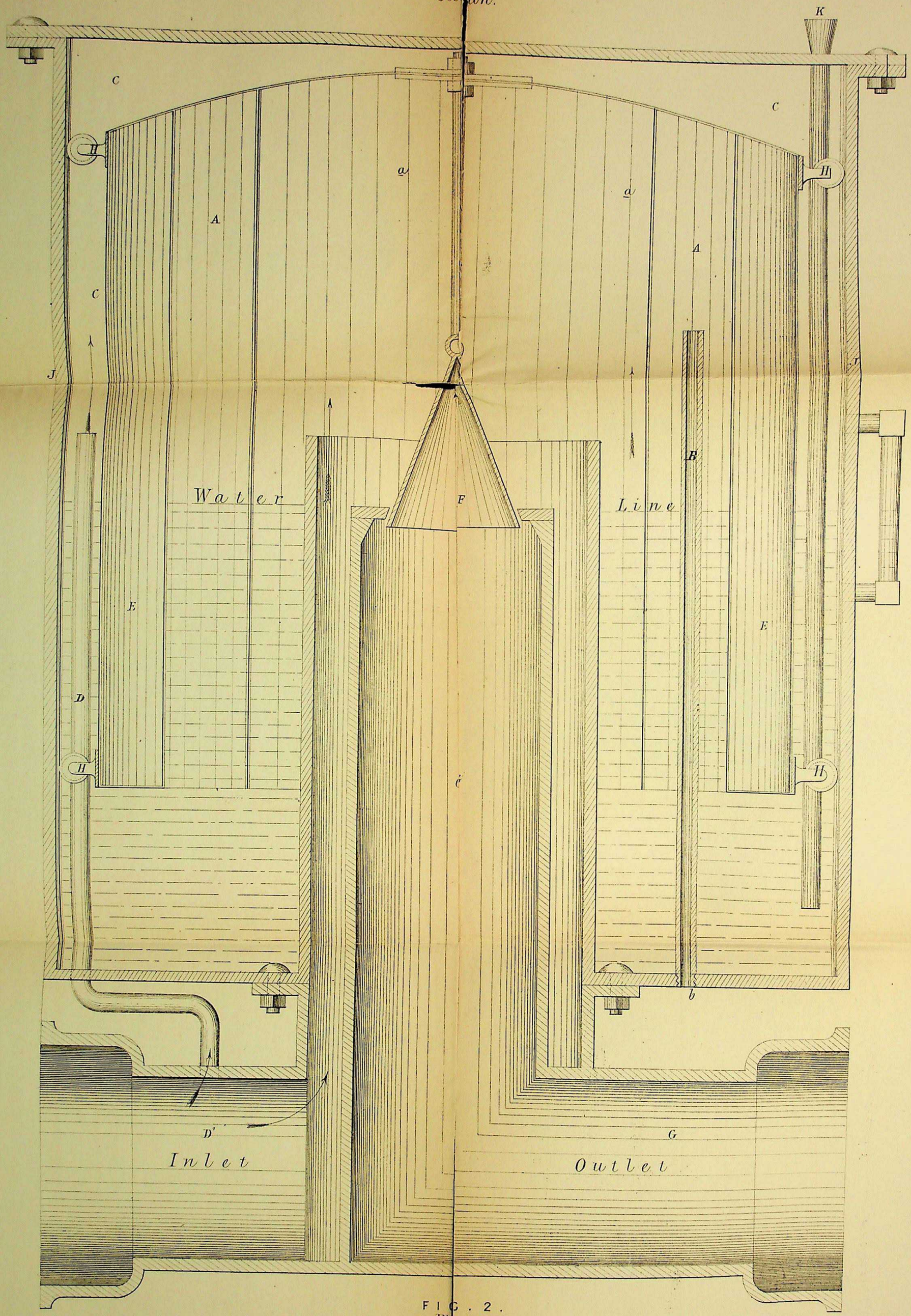


FIG. 2.

Plan

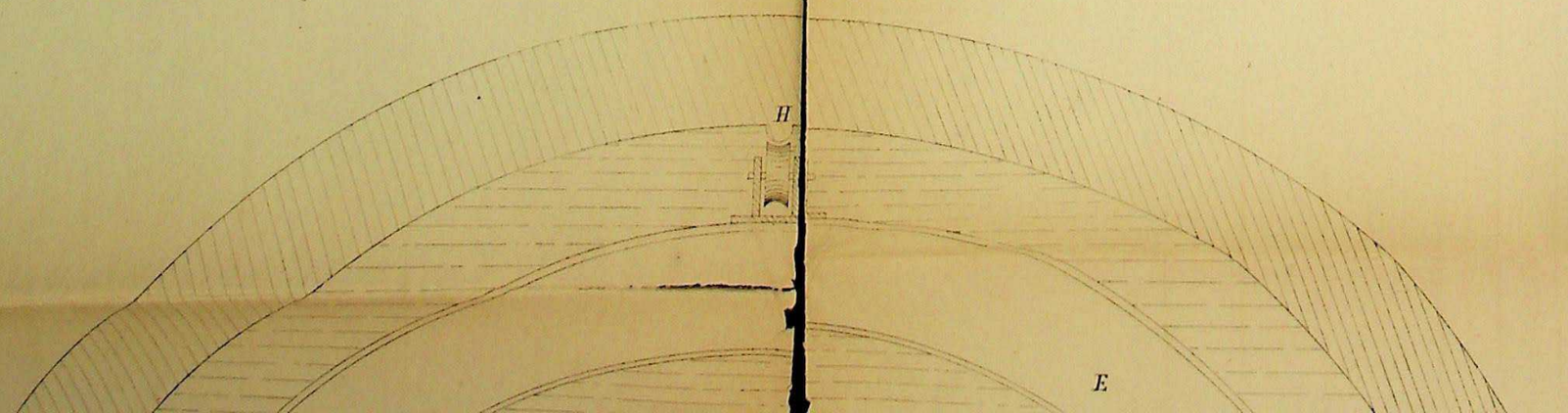
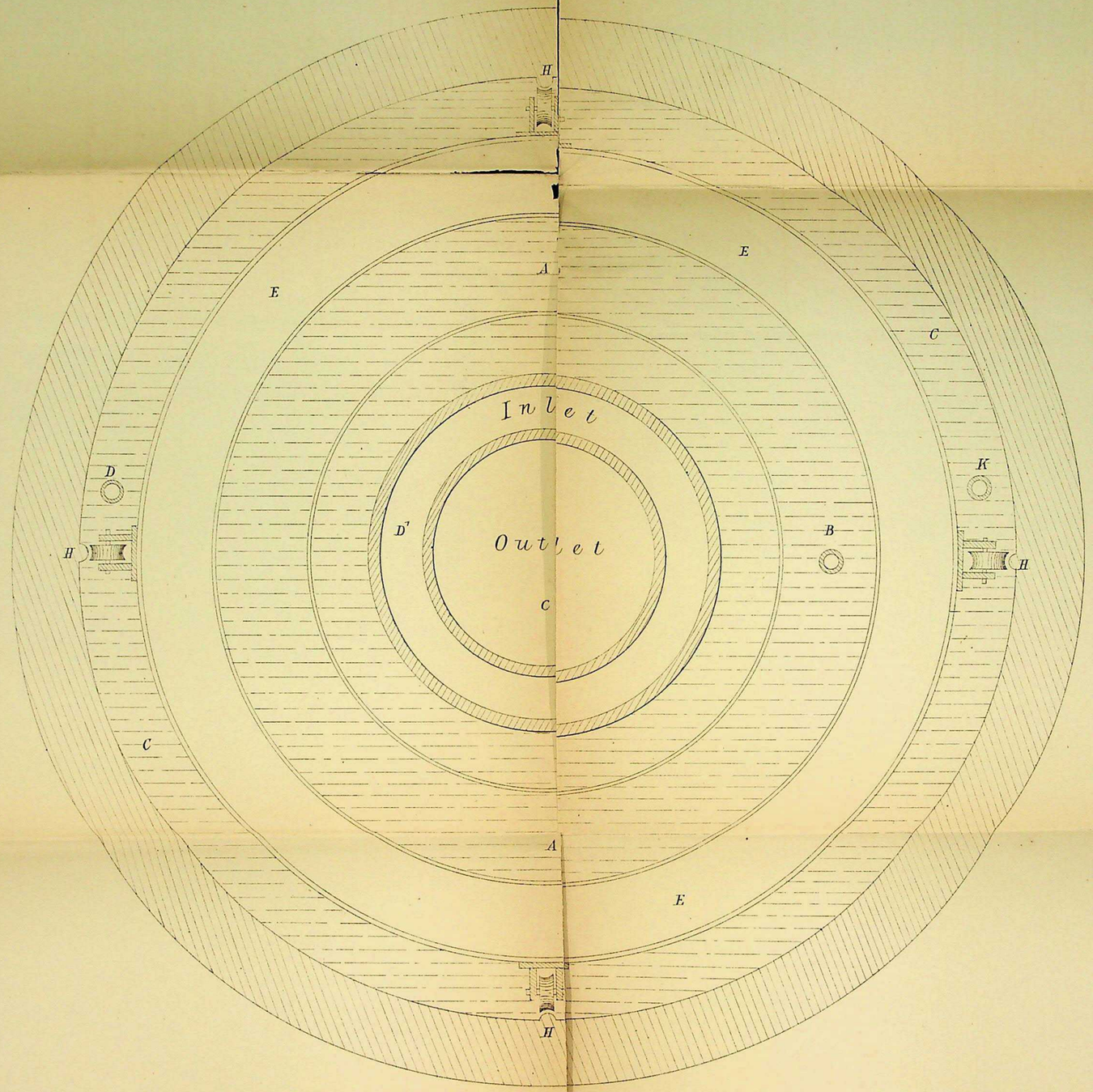


FIG. 2.

Plan



drawing is partly colored

Drawn on Stone by Malby & Sons.

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Printers to the Queen's most Excellent Majesty. 1866.